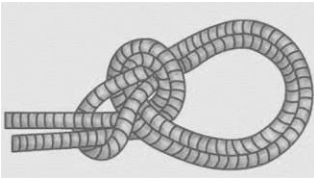

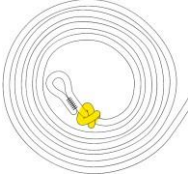

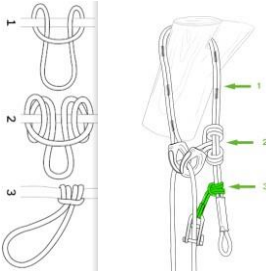
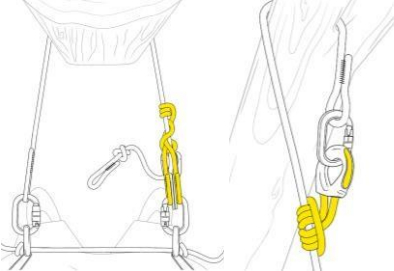
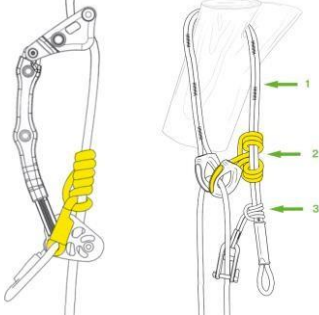


	<b>CO-ORDINATION OF NOTIFIED BODIES</b> <b>PPE Regulation 2016/425</b>  <b>RECOMMENDATION FOR USE</b>	PPE-R/11.088 <b>Version 4</b>  Update: rewriting of the solution								
Number of pages: <b>4</b>	Approval stage :                      Approved on :									
Origin : Vertical Group 11 'Protection against Falls from a Height'	<table border="0"> <tr> <td><input checked="" type="checkbox"/> Vertical Group n/a</td> <td>09/10/2024</td> </tr> <tr> <td><input checked="" type="checkbox"/> Horizontal</td> <td>15/09/2025</td> </tr> <tr> <td colspan="2">Committee</td> </tr> <tr> <td><input type="checkbox"/> EU PPE Expert Group</td> <td><input type="checkbox"/></td> </tr> </table>		<input checked="" type="checkbox"/> Vertical Group n/a	09/10/2024	<input checked="" type="checkbox"/> Horizontal	15/09/2025	Committee		<input type="checkbox"/> EU PPE Expert Group	<input type="checkbox"/>
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Question related to <input checked="" type="checkbox"/> PPE Regulation	<input checked="" type="checkbox"/> EN/prEN: any EN on fall arrest if relevant                      Other:									
Article:	Annex:	Clause:								
Key words: Rope / Knots, technique, end user										
<p>Question</p> <p>Most fall protection systems require a certain element of installation (such as connecting various components) and therefore rely on subsequent training by the end user.</p> <p>How shall the Notified Bodies assess products that require the end user to tie special knots in order to use the PPE according to the instructions for use?</p>										
<p>Solution</p> <p><i>Note: There are many possible interpretations of this question, and it is impossible to consider all potential designs in this RfU. Therefore, the solution starts with some examples of designs to show, which applications are addressed in this RfU by additional test requirements and which are not.</i></p> <p><b>Note: in following text “SRT” means Single/Stationary Rope Technique</b></p>										

Solution:

No.	Example	Design Example	Solution
1.	The end user is making a termination knot for an EN 892+A3:2023 rope or an additional knot to the figure-of-8-knot termination for an EN 1891:1998 <b>not impacting the construction</b> (e.g. 'bowline knot for rock climbing, knot for tree pruning,...)		No additional testing according to this RfU. It is the responsibility of the end user to make a suitable termination knot. The figure-of-8-knot is part of every EU-Type examination for kernmantel ropes. There is no requirement to test every potential knot.
2.	The rope termination is <b>impacting the construction</b> : e.g. spliced termination on a rope		No additional testing according to this RfU. This termination cannot be made by any end user. It needs to be certified (module B and modules C2 or D) using the applicable EN depending on the final use (e.g. EN 1891:1998).
3.	The end user has to tie a special knot in order to fulfil static/dynamic performance requirements of a standard labelled on the PPE.  Example: 3.1 The end user has to tie a special stopper knot at the end of a rope (e.g. to pass static EN 358:2018 or EN 353-2:2024 requirement).  Example 3.2 The end user has to make an inline knot <u>only in certain circumstances</u> (e.g. an EN 795-B:2012 device, which needs an additional knot when used by ≥ 2 users -> TS 16415-B:2013)	3.1   3.2 	Acceptable, when the tests are performed with these knots and when it is ensured ('ready-to-use' / clear instructions) that the PPE must not be used without the knot.  3.1 No additional testing according to this RfU The product must be placed on the market 'ready-for-use' (EN 358:2018 or EN 353-2:2024 requirement). If the manufacturer allows replacement/spare, it must be clear in the IfU, how to tie all terminations.  3.2 Not acceptable unless Instructions for use precise that this is only for rescue (or other exceptional circumstances)
4.	Instructions for use of a rope/support (e.g. EN 1891:1998 / EN 892+A3:2023): when instructions show a potential adaptation with a friction knots (e.g. by a drawing) but not as mandatory for the rope/support to be used.		No additional testing or requirement to certify the rope/support, e.g. EN 1891:1998 / EN 892+A3:2023)  <i>Note: The purpose of the <b>green-highlighted</b> prusik-sling is only for rope retrieval. No additional testing required.</i>
5.	A <b>friction knot</b> as a mandatory component of a whole PPE system (e.g. the length adjustment is accomplished by the use of friction hitches).  The product is placed on the market 'ready-to-use' but the manufacturer allows the replacement of the knot to change components of the PPE.		See additional requirements on page 2.  <i>Note: The intended use of the left picture is work positioning according to EN 358:2018 The intended use of the right picture is to form an anchor point in a tree (EN 795:2012)</i>
6.	A friction knot as a mandatory component of a whole PPE system. The intended use of the system requires the user to tie the knot each time, before the system is ready to use. (e.g. an ascending/descending SRT system use in arborist activities).		See additional requirements on page 2.  <i>Note: The intended use of this system (left) is ascending and descending in a SRT (). While the EN 12841:2024 addresses systems like this, a PPE system, where the friction knot is the access point of adjusting and descending, cannot be labelled according to EN 12841:2024, because a friction hitch cannot be considered as a '3.1 rope adjustment device'</i>

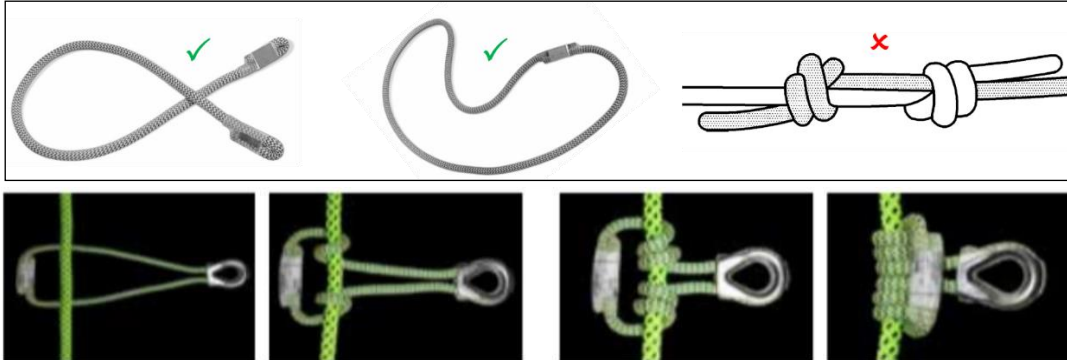
### Specific requirement for friction hitches included in a PPE system against falls from a height

Note: Examples for friction knots are: prusik, valdotain-tresse, distel, michoacan, machard, catalyst, ....

Every friction hitch system includes a guiding rope with a larger diameter and a sling/loop or "accessory cord/tape"... with a smaller diameter that is tied around the guiding rope in a special way to generate friction between the two components. It must be possible to adjust the position of the friction hitch. Since there are a lot of different possible variations of these knots (e.g. 4-coils or 5-coils), there is no list of allowed friction hitches in this document.

#### 1. General requirements

The component (lanyard / sling) that is used to make the friction hitch must have prefabricated terminations and a defined length.



The manufacturer must define all intended modes of use and all possible variations of the friction hitch(es).

#### 2. Testing

The tests should be carried out according to the intended use of the whole system (e.g. EN 358:2018, EN 795:2012, EN 12841:2024 ...). If there is no applicable standard for the whole system, the tests should be carried out according to a risk assessment which considers:

- The intended use (manufacturer's instructions and information)
  - o single strand / double strand
  - o ergonomic test to check the performance while ascending / descending in a SRT-system
- The Essential Health and Safety Requirement of the PPE Regulation
- Test procedures from other EN standards and applicable RfUs (e.g. maximum user weight).

Following tests shall be considered:

**Important note:** in following 'each combination' means all combinations of different guiding ropes (diameter, core construction, mantle construction,...) x different friction lanyards (diameter, termination, constructions, length...) x different friction hitch type knots (knot, number of coils, residual length,...)

Example of combinations for which the following test protocol would apply:

Combination	Guiding rope	Friction Lanyard	Friction Hitch Type
1	Rope A (diameter A1, core construction A2, mantle construction A3,...)	Lanyard A, length: 60 cm	Catalyst (3 -coil)
2			Distel (4-coil)
3		Lanyard B, length: 65 cm	Distel (4-coil)
4		Lanyard C, length: 70 cm	Michoacan (5-coil)
5	Rope B (diameter B1, core construction B2, mantle construction B3,...)	Lanyard A, length: 60 cm	Catalyst (3 -coil)
6		Lanyard C, length: 70 cm	Distel (4-coil)
7		Lanyard B, length: 65 cm	Michoacan (4-coil)
8	etc	...	...

Note: Even though EN 12841:2024 allows the testing on the maximum and minimum diameter of the guiding rope, the same principle cannot be applied to friction hitches. The diameter of both ropes is important, but not the only characteristic that determines the behaviour of the friction-hitch-system. The construction of the rope and the mantle properties of both components are also important parameters for the performance.

#### 2.1 Working performance test

Each combination shall withstand the 'minimum working performance test' according to EN 12841:2024 – section 4.4.3 / 5.5.2.

## 2.2 Static test on the friction lanyard

The loop/lanyard/sling that is used to tie the friction hitch on the guiding rope must fulfil the static requirements of EN 566:2017 – section 3.3/4.3.

## 2.3 Static test on the combination

**2.3.1** If the friction hitch is just used as an additional stopper and placed behind the actual braking device, each combination (friction hitch on guiding rope) shall withstand a force of **F = 12 kN** for 3 minutes (according to EN 12841:2024 – section 4.5.3 / 5.5.3)

**2.3.2** otherwise (e.g. when there is a risk of a fall if the friction hitch breaks) each combination shall withstand a force of **F = 15 kN** for 3 minutes (according to EN 12841:2024 – section 4.3.3 / 5.5.3)

## 2.4 Dynamic strength test

Each combination shall be tested using a rigid steel mass of 100kg or a mass equivalent to the maximum rated load. Depending on the intended use, different test procedures are applicable:

**2.4.1** If the intended use of the system is in line with the definition of EN 12841:2024 section 3.5 (Type A) perform a dynamic test according to EN 12841:2024 section 5.6.2.

The rigid test mass shall be held clear of the ground.

The locking distance of the friction hitch  $H_{LD}$  (as defined EN 353-1:2014+A1:2017 section 3.6) shall not exceed 1 m.

**2.4.2** If the intended use of the system is in line with the definition of EN 12841:2024 section 3.6/3.7 (Type B/C) perform a dynamic test according to EN 12841:2024 section 5.6.4.

The rigid test mass shall be held clear of the ground.

The locking distance of the friction hitch  $H_{LD}$  (as defined EN 353-1:2014+A1:2017 section 3.6) shall not exceed 1 m.

**2.4.3** Any other application shall be tested with a fall factor = 2.

The rigid test mass shall be held clear of the ground.

The locking distance of the friction hitch  $H_{LD}$  (as defined EN 353-1:2014+A1:2017 section 3.6) shall not exceed 1 m.

## 3. Marking

Each load bearing component that might be removable must have a marking:

- Show/define authorized combinations
- State the correspondence to the whole system

*Example: 'Component name 1' part of 'system name', 'Component name 2' part of 'system name', etc.*

## 4. Manufacturer's instructions and information

The manufacturer's instructions and information must show and explain all possible attachments of the system.

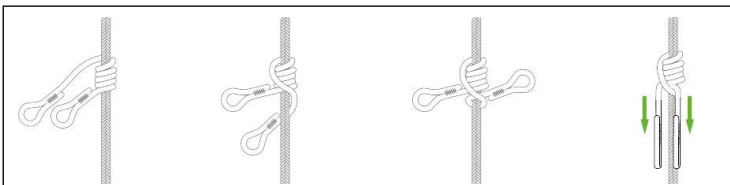
If the manufacturer allows the end user to replace a component as a spare parts (e.g. ventral attachment using a knot on an arborist harness), a detailed description with pictures must be included in the Instructions for use.

Every tested and approved combination of guiding rope and friction hitch must be explained in manufacturer's instructions and information.

*Note: The length of the lanyard (for the friction hitch) is very important for the functionality and performance of the whole system.*

The setup of all approved friction knots must be explained in the instructions for use.

*Note: Many friction knots have different names. So, it is important that the manufacturer shows unequivocal pictures of each step of tying the knot. Example of a Distel (4-coil) friction hitch:*



Every system component must be identifiable.

There must be a described functional test in the manufacturer's instructions and information to test the performance of the friction knot (which movement is allowed; in which directions the knot should not move etc)

There must be a warning to check the reliable grab function of the friction hitch before every use.